## Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

## **Listing of Claims:**

- p-type group II-VI semiconductor material and an n-type semiconductor material, wherein the p-type group II-VI semiconductor comprises a single crystal thin film of a group II-VI semiconductor comprises a single crystal thin film of a group II-VI semiconductor comprising atoms of group II elements and atoms of group VI elements, wherein the group II-VI semiconductor is doped with one or more p-type dopants selected from nitrogen, phosphorus, arsenic, antimony, bismuth, copper, and chalcogenides of the foregoing, and mixtures thereof, wherein the p-type dopant concentration in the group II-VI semiconductor is greater than about 10<sup>16</sup> atoms cm<sup>-3</sup>, wherein semiconductor resistivity is less than about 0.5 ohm cm, and wherein the carrier mobility is greater than about 0.1 cm<sup>2</sup>/V·s, and wherein the p-type group II-VI semiconductor material has a luminescent peak at about 3.357 eV.
- 2. (original) A solid state device according to claim 1, wherein the group II elements are selected from zinc, cadmium, alkaline earth metals, and mixtures thereof.
- 3. (original) A solid state device according to claim 1, wherein the group VI elements are selected from oxygen, sulfur, selenium, tellurium, and mixtures thereof.
  - 4. (cancelled).
- 5. (original) A solid state device according to claim 1, wherein the p-type dopant is phosphorus.
- 6. (original) A solid state device according to claim 1, wherein the p-type dopant is arsenic.
- 7. (original) A solid state device according to claim 1, wherein the p-type dopant is antimony.
- 8. (original) A solid state device according to claim 1, wherein the p-type dopant is bismuth.
  - 9. (cancelled).

- 10. (cancelled).
- 11. (original) A solid state device according to claim 1, wherein the thin film of a group II-VI semiconductor is deposited by a chemical deposition process selected from RF sputtering, CVD (chemical vapor deposition), MOCVD (metal organic chemical vapor deposition), spin coating, electrophoresis, and hydrothermal growth processes.
- 12. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is zinc oxide.
- 13. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is zinc sulfide.
- 14. (original) A solid state device according to claim 1, wherein the device is a light emitting diode.
- 15. (original) A solid state device according to claim 1, wherein the device is a laser diode.
- 16. (original) A solid state device according to claim 1, wherein the device is a field effect transistor.
- 17. (original) A solid state device according to claim 1, wherein the device is a photodetector.
- 18. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength in the range from about 207 nm to 810 nm.
- 19. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength of about 441.6 nm.
- 20. (original) A solid state device according to claim 1, wherein the device emits light at a wavelength of about 325 nm.
- 21. (original) A solid state device according to claim 1, wherein the group II-VI semiconductor material is disposed on an amorphous self supporting substrate surface.
- 22. (original) A solid state device according to claim 1, wherein the n-type semiconductor material is an n-type group II-VI semiconductor.
- 23. (currently amended) A solid state device comprising a p-n junction containing a p-type zinc oxide and an n-type semiconductor material, wherein the p-type zinc oxide comprises

single crystal zinc oxide that is doped with one or more p-type dopants, wherein the p-type dopant concentration in the zinc oxide is greater than about 10<sup>16</sup> atoms·cm<sup>-3</sup>, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm<sup>2</sup>/V·s, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV.

- 24. (original) A solid state device according to claim 23, wherein the p-type dopant is phosphorus.
- 25. (original) A solid state device according to claim 23, wherein the p-type dopant is arsenic.
- 26. (original) A solid state device according to claim 23, wherein the p-type dopant is antimony.
- 27. (original) A solid state device according to claim 23, wherein the p-type dopant is bismuth.
- 28. (original) A solid state device according to claim 23, wherein the p-type dopant is copper.
- 29. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide further comprises magnesium oxide.
- 30. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide further comprises cadmium oxide.
- 31. (original) A solid state device according to claim 23, wherein the n-type semiconductor material is an n-type zinc oxide.
- 32. (original) A solid state device according to claim 31, wherein the n-type zinc oxide contains an n-type dopant selected from ions of Al, Ga, B, H, Yb and other rare earth elements, Y, Sc, and mixtures thereof.
- 33. (original) A solid state device according to claim 23, wherein the device is a light emitting diode.
- 34. (original) A solid state device according to claim 23, wherein the device is a laser diode.

- 35. (original) A solid state device according to claim 23, wherein the device is a field effect transistor.
- 36. (original) A solid state device according to claim 23, wherein the device is a photodetector.
- 37. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength in the range from about 310 nm to 660 nm.
- 38. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength of about 441.6 nm.
- 39. (original) A solid state device according to claim 23, wherein the device emits light at a wavelength of about 325 nm.
- 40. (original) A solid state device according to claim 23, wherein the single crystal zinc oxide is disposed on an amorphous self supporting substrate surface.
- 41. (currently amended) A solid state device according to claim 23 40, further comprising a barrier layer disposed between the single crystal zinc oxide and the amorphous self supporting substrate surface.
- 42. (New) A solid state device comprising a p-n junction containing a p-type zinc oxide and an n-type semiconductor material, wherein the p-type zinc oxide comprises single crystal zinc oxide that is doped with a quantity of phosphorous, wherein the phosphorous dopant concentration in the zinc oxide is greater than about 10<sup>16</sup> atoms·cm<sup>-3</sup>, wherein semiconductor resistivity is less than about 0.5 ohm·cm, and wherein the carrier mobility is greater than about 0.1 cm<sup>2</sup>/V·s, and wherein the p-type zinc oxide semiconductor material has a luminescent peak at about 3.357 eV
- 43. (New) A solid state device according to claim 42, wherein the p-type zinc oxide further comprises magnesium oxide.
- 44. (New) A solid state device according to claim 42, wherein the p-type zinc oxide further comprises cadmium oxide.